MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 2235
MSDS Number: 2235
SRM Name: Bismuth for Thermal Analysis

Date of Issue: 12 October 2004

MSDS Coordinator: Mario J. Cellarosi
Phone: (301) 975-6776
FAX: (301) 926-4751
E-mail: SRMMSDS@nist.gov
Emergency Tel. ChemTrec: 1-800-424-9300 (North America)
+1-703-527-3837 (International)

Description: This Standard Reference Material (SRM) is intended for use in calibrating differential scanning calorimeters, differential thermal analyzers, and similar instruments. This SRM consists of a small sample of high purity bismuth. This sample consists of 1.5 g of shot with diameters of about 1 mm.

Substance: Bismuth

Other Designations: **Bismuth** (bismuth element)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EINECS	Purity (%)
Bismuth	7440-69-9	231-177-4	100

Classification Index, R/S Phrases (EC): Not classified.

3. HAZARDS IDENTIFICATION

Major Health Hazards: No significant target effects reported.
Physical Hazards: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.
Potential Health Effects:
Inhalation: No information on significant adverse effects.
Skin absorption: No information on significant adverse effects.
Eye contact: No information on significant adverse effects.
Ingestion: No information on significant adverse effects.

Listed as a Carcinogen/Potential Carcinogen:	Yes	No
National Toxicology Program (NTP) Report on Carcinogens		X
International Agency for Research on Cancer (IARC) Monographs		X
Occupational Safety and Health Administration (OSHA)		X

4. FIRST AID MEASURES

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Obtain medical assistance if necessary.
Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.
Inhalation: This material is supplied in solid bead form and inhalation is unlikely to occur.
Ingestion: If a large amount is swallowed, get immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire and explosion hazard. Dust/air mixtures may ignite or explode.
Extinguishing Media: Dolomite, dry powder for metal fires, dry sand, graphite, soda ash, and sodium chloride.
Fire Procedures: Do not get water directly on material. Avoid inhalation of combustion by-products.

Flash Point (°C): Not applicable. **Autoignition (°C):** Not applicable.

Flammability Limits in Air (Volume %): **UPPER:** Not applicable.
LOWER: Not applicable.

Flammability Class (OSHA): Not applicable.

6. Accidental Release Measures

Occupational Release: Collect spilled material in appropriate container for proper disposal.
Environmental Precautions: See "Section 13".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Bismuth reacts with air. The sample should be stored under an inert gas, e.g. argon or nitrogen.

8. Exposure Controls and Personal Protection

Hazardous Component	Purity (%)	Exposure Limits and Toxicity Data
Bismuth	100	LD_{50} (Oral-Rat): > 5 g/kg

Engineering: An eye wash station and drench shower should be readily available near the handling and use areas.
Ventilation: Local exhaust ventilation system.
Respirator: Appropriate respirator protection required for bismuth dust, see 42CFR84 for selection and use.
Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory.
Personal Protection: Chemically resistant gloves and clothing are recommended.

9. Physical and Chemical Properties

Bismuth	
Appearance and Odor: Solid beads, odorless.	**Specific Gravity (water = 1):** 9.8
Molecular Formula: Bi	**Boiling Point (°C):** 1560
Molecular Mass: 208.98	**Water Solubility:** Insoluble.
Melting Point (°C): 271	

10. Stability and Reactivity

Stability: **X** **Stable** ____ **Unstable**

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid conditions that will transform material into dust or fumes.

Incompatibility (Materials to Avoid): Acids. Metals. Oxidizing materials. Halogens.

Hazardous Decomposition or Byproducts: Thermal decomposition produces miscellaneous products.

Hazardous Polymerization: ____ **Will Occur** __X__ **Will Not Occur**

11. TOXICOLOGICAL INFORMATION

Route of Entry: ____ **Inhalation:** ____ **Skin** __X__ **Ingestion**

Health Hazards (Acute): Bismuth compounds have minor or no effects on mucous membranes, and skin. For eye contact, injury may result in the case of combination with strong acidic salts. See "Section 8", for toxicity data.

Medical Conditions Generally Aggravated by Exposure: Not applicable.

12. ECOLOGICAL INFORMATION

Adverse Effects: Not applicable.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state and local regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001

14. TRANSPORTATION INFORMATION

DOT Registry: Not classified.

15. REGULATORY INFORMATION

U.S. REGULATIONS

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):

ACUTE: No
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No

EC RISK AND SAFETY CLASSIFICATION: Not classified.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Bismuth,* 15 December 2003.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.